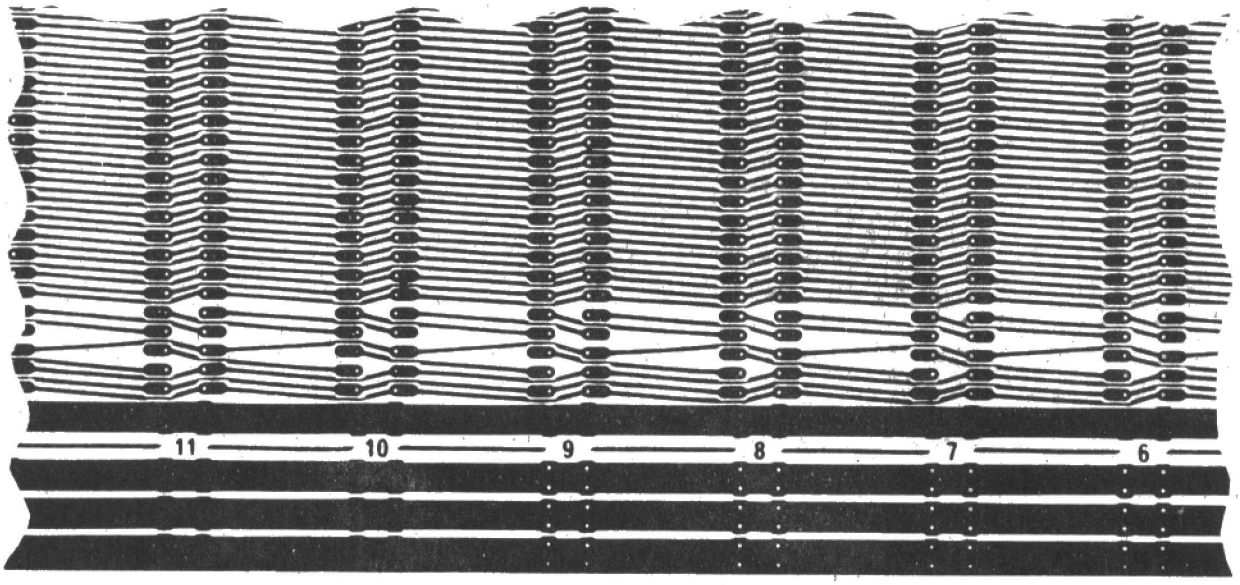
Document Ref: IBUS-BDS
Issue No: 1. July 1982

Greenbank Electronics
Telephone: 051-645 3391

# Interak 1

**13 SLOT BUSBOARD**

**13-Slot ISBUS Back-board**




**13-Slot ISBUS Back-board**

## FEATURES

* Epoxy Glass, Tinned.
* Drilled for Both ISBUS-A (Single-sided) and ISBUS-B (Double-sided) edge connectors.
* INTERAK 1 Compatible (and Beyond).
* Single Sided, All Tracks Visible, and thus Repairable.
* Low Cost.
* Provision for Multiple Power Supplies (0V, +5V, +12V, -12V).
* Includes 3 "Daisy Chain" Lines for Future Enhancements, or for Present Users' Experiments.
* Suits International Size Cards (4.5" x 8")
* Fits 19" Rack, with Space for Power Supply at One End.
* Insertion Force of Plug in Cards is Transmitted to Rack Metalwork Directly, to Avoid Flexing the ISBUS Backboard Itself.
* Dimensions 4.4" x 12.9"
* Space for 13 Cards on 1" Centres.

## DESCRIPTION

The ISBUS backboard is used to interconnect all the INTERAK 1 cards. The ISBUS allocations are in two forms: ISBUS-A, which defines the signals on the A-side 43-way connector used for the cards, and ISBUS-B. ISBUS-B is at the moment a future development and will define the signals on the B-side 43-way connector. Such refinements as an extra 8 address lines, and an extra 8 data lines, and interrupts and the like are the kind of thing which will be added. However, once all of this additional complexity is added it is possible that the Interak system will have strayed away too far from its original concept of being a reasonably priced, easy to understand, affordable rack-and-card system.

The main decision a user has to make is whether or not to go for single or double-sided connectors. Most people will probably choose single-sided cards if they are building an INTERAK 1 System now, since INTERAK 1 cards are all based on the ISBUS-A allocations. (Some of the newer INTERAK cards do have gold-plating on both A- and B-sides, but it serves no function at the moment.)

## Mounting

The ISBUS backboard is fitted towards the left-hand side of a 19" card frame (viewed from the front). This leaves a generous amount of space to the right for the user to fit his power supply, as a slide-in module, or built into the rack. For safety reasons the mains voltage is taken directly to the power supply, and only the low voltages are taken to the ISBUS board. For maximum reliability the power rail connections are soldered onto the ISBUS board at the power supply end.

## Power Supplies

The power supply tracks are much broader than those used for signals and the thickness of all tracks has been increased by tinning to minimise the voltage drop when the board is fully loaded.

## Mechanically Rigid

The ISBUS board is used solely for interconnecting the edge connectors. The edge connectors are each bolted into the rack directly, so that the rack takes the force when cards are plugged in and out. Often the system of plug in cards is criticised unfairly for being unreliable, when in fact it is the design which is wrong. There is a popular cheap computer on the market which has a rear mounted plug in memory expansion which is notorious for unreliability, but the cause is quite simply the lack of mechanical support - the edge connector should not serve this purpose as well as make the interconnections.

The method used for mounting the ISBUS means that it is not constantly being flexed back and forth when cards are plugged in and out. This is important as the tiny copper tracks could easily develop hairline fractures if subjected to such abuse, causing intermittent faults which are the world's worst in a computer.

## CONTENTS OF KIT

A kit is not provided for this card, since it is not known how many and what type of edge connector the user will be fitting. Therefore the card is sold separately and the purchaser can choose for himself how many edge connectors he wants, and whether they should be single or double sided.

## Bus Allocations

On the next page is given the allocations for ISBUS-A which is the standard adopted for the Interak 1 computer system.

## ISBUS-A BUS ALLOCATIONS

| | | |
|---|---|---|
| A1. | NIOREQ | I/O Request |
| A2. | NMREQ | Memory Request |
| A3. | NWDS | Write Data Strobe |
| A4. | NRDS | Read Data Strobe |
| A5. | AB15 | Address Bus |
| A6. | AB14 | Address Bus |
| A7. | AB13 | Address Bus |
| A8. | AB12 | Address Bus |
| A9. | AB11 | Address Bus |
| A10. | AB10 | Address Bus |
| A11. | AB9 | Address Bus |
| A12. | AB8 | Address Bus |
| A13. | AB7 | Address Bus |
| A14. | AB6 | Address Bus |
| A15. | AB5 | Address Bus |
| A16. | AB4 | Address Bus |
| A17. | AB3 | Address Bus |
| A18. | AB2 | Address Bus |
| A19. | AB1 | Address Bus |
| A20. | AB0 | Address Bus |
| A21. | NRST | Reset |
| A22. | DB7 | Data Bus |
| A23. | DB6 | Data Bus |
| A24. | DB5 | Data Bus |
| A25. | DB4 | Data Bus |
| A26. | DB3 | Data Bus |
| A27. | DB2 | Data Bus |
| A28. | DB1 | Data Bus |
| A29. | DB0 | Data Bus |
| A30. | NIIN | Daisy Chain (Not Used) |
| A31. | NIOUT | Daisy Chain (Not Used) |
| A32. | NRFSH | Dynamic RAM Refresh |
| A33. | Ø | 4.0 MHz Z80A Clock |
| A34. | NWAIT | Wait State Request |
| A35. | +12V | Power Supply |
| A36. | +12V | Power Supply |
| A37. | Pol | Polarisation Slot |
| A38. | -12V | Power Supply |
| A39. | -12V | Power Supply |
| A40. | 0V | Power Supply |
| A41. | 0V | Power Supply |
| A42. | +5V | Power Supply |
| A43. | +5V | Power Supply |

(The KBUS-12 allocations used for some "Kemitron" cards are substantially the same, except that the NWAIT line is on A30, the signal on A31 is designated "spare", and the NRST line on A21 is a TTL totem pole output not open-collector. The KBUS-5 allocations used on some other "Kemitron" cards are the same as for KBUS-12, except that the voltage rail on A38 and A38 is -5V not -12V. For consistency and safety, the Interak 1 uses the one bus standard throughout, namely the ISBUS-A, as listed above.)